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**BEDS AND MATTRESSES**

This invention relates to beds and mattresses, and more particularly to beds and mattresses incorporating a plurality of springs, the aim of the invention being to provide a sprung bed or mattress in which the firmness of the bed or mattress may be varied by varying the compression of the springs of the bed or mattress, or some at least of said springs.

There has been several prior proposals for providing such beds or mattresses, but such prior proposals have all been complex in nature - see for example United States Patent Nos 3,739,409 (Johnson) and 2,724,842(Rogovy). Both of these prior United States patents proposed complicated and expensive constructions for varying the compression of the springs of a bed or mattress, and the present invention seeks to obviate the drawbacks and disadvantages of these and other proposals.

According to one aspect of the present invention there is provided a bed or mattress including a plurality of springs which, or some at least of which, are movable in their axial directions so as to vary the

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compression of the springs or some at least of said springs, without materially or substantially changing the position of the upper surface  
05 of the bed or mattress.

The springs may be coil springs, pocketed springs, double pocketed springs, helical springs, or any other suitable springs.

10 The bed or mattress will preferably include a base to which the springs, or some of the springs, may be directly or indirectly secured, said base being movable in the axial direction of the springs so as to vary the compression of said springs or some at least of said springs, an upper surface of said bed or mattress remaining in the same  
15 horizontal plane or substantially the same horizontal plane regardless of the degree of compression of said springs or some at least of said springs and the position of said base.

The base may be formed as a single structure or alternatively the base  
20 may be formed of a plurality of sections movable independently of one

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another so that the compression of the springs may be varied in selected areas or in a selected area of said bed or mattress.

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The springs will be arranged in rows each surrounded or partially surrounded by fabric, or alternatively two rows, three rows, or more may each be surrounded or partially surrounded by a single piece of fabric or other material. Alternatively, the rows of springs or some of  
10 said rows of springs may be secured directly to said base. In yet a further alternative, adjacent rows of springs or groups of rows of springs may be adhesively secured together and a bar or other means may be located between said rows or groups of rows of springs.

15 The springs will preferably be single pocketed springs, double pocketed springs, i.e. a pocketed spring within a pocketed spring, pocketed springs arranged in end-to-end and co-axial relationship, or a combination thereof.

20 The base or a part or parts of said base may be moved in the axial

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direction of the springs by means of one or more air bags, screw  
motors, electric motors, or by means of jack handle(s) or by any other  
05 suitable means, the number of such means being a matter of choice.

According to a second aspect of the present invention there is provided  
a method of varying the compression of the springs or some at least of  
the springs of a bed or mattress including a plurality of springs  
10 secured directly or indirectly to a base of said bed or mattress, the  
method comprising moving the base or at least a part or parts of the  
base in the axial direction of the springs whilst maintaining an upper  
surface of the bed or mattress in the same horizontal plane or  
substantially the same horizontal plane regardless of the degree of  
15 compression of the springs and the position of said base.

In order that the invention may be more readily understood,  
embodiments thereof will now be described, by way of example only,  
reference being made to the accompanying drawings, wherein:  
20 Figure 1 is a diagrammatic representation of a plurality of springs

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forming part of a bed or mattress according to the invention;

Figures 2 and 3 are views similar to Figure 1, but showing alternative  
05 arrangements of the springs;

Figures 4 and 5 show how the rows of springs are secured together  
when forming the bed or mattress;

Figure 6 is a view similar to Figure 1 and shows a base forming a part  
of the bed or mattress; and

10 Figure 7 is a view similar to Figure 6, but showing the base or a  
portion of the base in a different position during compression of some  
of the springs of the bed or mattress.

Referring to the drawings, and firstly to Figure 1, there is shown a  
15 plurality of pocketed springs arranged in side-by-side rows, one spring  
of each row being indicated by the reference numerals 2 to 16, it being  
understood that the whole bed or mattress will comprise more rows of  
springs than is shown in Figure 1. As will be seen, each of the springs  
2 to 16 are pocketed springs and in fact are double pocketed springs  
20 in that each spring comprises an outer spring and an inner spring

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which is itself a pocketted spring.

05     The double pocketted springs of each row of springs is enclosed in a  
shroud of fabric or other suitable material, one of such shrouds being  
indicated by reference numeral 18, it being understood that all of the  
other shrouds are identical. Each of the shrouds, such as that which is  
indicated at 18, is open-ended at its lower end as clearly shown in the  
10     drawing, the lower ends of the shroud being secured by suitable means  
to a rigid or semi-rigid base, not shown in Figure 1.

Referring now to Figure 2, it will be seen that two rows 20 and 22 of  
double pocketed springs are enclosed by a shroud 24, whilst in Figure  
15     3, three rows 26,28, and 30 are enclosed by a single shroud 32, the  
ends of the shroud 24 and the ends of the shroud 32 again being  
secured to a rigid or semi-rigid base of the bed or mattress.

Instead of the shrouds 18, 24, and 32 being discrete shrouds, such  
20     shrouds may each be formed as a single continuous shroud.

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Referring now to Figure 4, this shows a plurality of rows of springs such as those shown in Figure 1 and shows the rows of pocketed  
05 springs secured together by adhesive 40A. Bars 40 running down the length of the rows are intended, in co-operation with the adhesive 40A, to prevent the whole row rising when the compression of the springs or some at least of the springs is varied as will be explained hereinafter. The bars are secured by suitable means to the base, the perimeter or  
10 other area of the bed or mattress such that they are not movable relative to the upper surface of the bed or mattress.

Although Figure 4 shows the bars 40 and adhesive 40A at approximately the middle position of the springs - in the uncompressed  
15 states - it will be appreciated that such bars and adhesive may in fact be located at any position along the length of the springs, including the lower extremities of the springs.

Figure 5 shows a view similar to Figure 4, and illustrates the securing  
20 of a number of the rows of pocketed springs to a base, such secure-

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ment being indicated by reference numerals 42 and being provided to prevent the attached rows from rising when the compression of the  
05 springs or some of the springs are varied. Again, the rows of springs are secured together by adhesive.

Referring now to Figure 6, this shows the rows of springs in Figure 5 secured to a base forming part of the bed or mattress, the base being  
10 indicated generally by reference numeral 50. The base 50 in fact is formed of a number of sections - indicated by reference numerals 50A, 50B, and 50C - the centre section 50B being movable in the axial direction of the springs by means indicated at 52, such means being, for example, one or more air motors, screw motor(s) electric motor(s)  
15 or by any other suitable means.

Figure 6 illustrates the centre section 50B in its inoperative position in which the springs are in their normal 'uncompressed condition, whereas Figure 7 shows that the centre section 50B has been raised,  
20 thereby compressing the associated springs to the positions shown in



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the Figure so as to change the firmness of the bed or mattress.

05 Whilst Figures 6 and 7 show only the centre section 50B as being  
movable, it will be appreciated that the other sections 50A and 50C of  
the base may also be movable. In fact, the whole base – formed as a  
single structure – may be movable so as to vary the compression of all  
of the springs of the bed or mattress. Indeed, the base may be formed  
10 such that it is formed of the same number of sections as there are rows  
of springs, in which case the compression of the springs in each  
individual row of springs may be changed independently of the springs  
in all the other rows.

15 The fact that the rows of springs are secured together by adhesive  
results in the uncompressed springs not moving upwardly when the  
base or a part or parts of the base is or are moved.

In addition, where the springs are double pocketed springs, the move-  
20 ment of the inner pocketed spring relative to the outer pocketed

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spring, without any movement of the outer pocketed spring, results in an increase in the firmness of the bed or mattress.

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Thus the invention provides a method of varying the compression of the springs of a bed or mattress without raising or lowering the upper surface of the bed or mattress so as to vary the firmness of the bed or mattress and thereby provide a bed or mattress whose firmness can be adapted to suit varying requirements of individual user of the beds or mattresses.

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It will be appreciated that whilst the illustrative examples of the invention have been related to double pocketed springs, the springs may be single pocketed springs or indeed any other type of spring normally associated with beds and mattresses.

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Finally, whilst the invention has been related to beds and mattresses, it will be understood that the invention is equally applicable to other items of upholstered units where firmness adjustment is desirable.

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